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World Bank Adjustment Lending and Economic Performance in Sub-Saharan Africa in the 1980s

A Comparison of Early Adjusters, Late Adjusters, and Nonadjusters

Ibrahim A. Elbadawi

Structural adjustment programs in Sub-Saharan African have not significantly improved growth in the second half of the 1980s, and they have hurt investment. They have significantly improved export performance but the perceived increases in export competitiveness and in the efficiency of investment (supposed to be generated by reform programs) have not been sufficient to counterbalance the decline in investment and to restore economic growth.

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This paper — a product of theTransition and Macro-Adjustment Division, Country Economics Department, and the Economics and Finance Division, Africa Technical Department — is part of a joint research effort by CECTM and AFTEF on "The Effectiveness of Adjustment Lending in Sub-Saharan Africa." Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Ana Maranon, room N11-025, extension 39074 (October 1992, 60 pages).

Using a methodology that allows for endogenizing decisions to participate in World Bank adjustment lending programs, and for testing the validity of assumptions about program participation, Elbadawi studies the effectiveness of these programs in Sub-Saharan Africa.

He shows that adjustment programs in Sub-Saharan Africa had no statistically significant effect on growth in the second half of the 1980s, compared with the first half, but they have had a significant and deleterious effect on investment.

Adjustment lending has significantly improved export performance in Sub-Saharan Africa, at least compared with nonadjusting African countries.

The perceived increases in export competitiveness and in the efficiency of investment (supposed to be generated by reform programs) has not been sufficient to counterbalance the ensuing decline in investment and hence to restore economic growth in Sub-Saharan Africa.

These findings must be qualified: the methodology for classifying countries as adjusting or nonadjusting does not allow for different degrees of implementation — so, strictly speaking, the findings reflect an assessment of the effectiveness of a proxy (adjustment lending) for the adjustment programs.

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World Bank Adjustment Lending and Economic Performance in Sub-Saharan Africa in the 1980s

A Comparison of Early Adjusters, Late Adjusters, and Nonadjusters

by
Ibrahim A. Elbadawi*

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1. INTRODUCTION

The average performance of the economies of SSA has worsened over the last two decades, and by the turn of the 1980s decade economic conditions in the continent assumed crisis proportions. Real GDP growth rate declined from an annual average of 3.7% in 1970-81 to only 1.4% for 1982-85. With the high and steady rate of population growth in Africa, this translated into substantial declines in the standard of living with per capita income declining at an average rate of 0.9% in 1970-81 and 2.5% in the following period 1982-85. Other concomitant aspects of Africa's economic crisis are reflected by the sharp declines in foreign sector indicators. Thus, between the above two sub-periods the average rate of growth of exports declined from 3.6% to 1.1% per annum.

The worsening export performance is closely related to the declining share of agriculture in the domestic economies of SSA and the expansion of the nontraded service sector between the two periods (see table (1.1)). Similarly, the average ratio of external debt service to exports increased sharply from an average of 9.6% in 1973-81 to average 16.7% for the 1982-85 period (table (1.2)), the stock of external debt to GDP ratio also rose from 39% in 1980 to 69% in 1987. In short the story of economic performance in Africa is summed up by Oyejide (1990), "There is very little debate regarding Africa's poor economic performance and the Long-term nature of the decline in living standards, particularly during the 1980s. But controversy continues to surround the issue of which factors are responsible for the crisis."

One important interpretation of the causes behind the diminished economic fortunes of SSA as described above, emphasizes the role of domestic economic

policies, especially real appreciation and real overvaluation[1]. The evidence from Sub-Saharan Africa (see table (1.2)) points to episodes of dramatic real appreciation over the seventies and the first half of the eighties. The real appreciation is clearly related to the high rate of fiscal expansion and the increased domestic absorption (negative of the resource balance) where both indicators respectively rose by 2.1 and 1.4 percentage points of GDP between the first two periods (table (1.2)).

On the face of these expansive macroeconomic policies, SSA experienced a severe negative external shock, where the value of this aggregate shock turned from a small but positive average of 0.1 to a negative at -5.3. The terms of trade component of this shock also reflect the same effect, with the TOT index declining from 106.3 in 1973-81 to 91.6 in 1982-85. Also external finance available to SSA dropped by more than 50% over the two periods. Therefore, as the RER is appreciated, the major fundamentals call for an equilibrium depreciation of the RER. Another evidence in support of this view is the tremendous expansion of parallel markets in SSA and the rising black market exchange rate premium which is directly related to real overvaluation and economic distortions in general (table (1.2)).

Another possible explanation of Africa's economic performance emphasizes the exogeneity of the determinants of economic growth in Africa, especially the effect due to the observed sustained worsening TOT for SSA and the declining external finance available to it. Regardless of the extent of domestic policy accommodation to external shocks, "The results of these unfavorable TOT have been increased indebtedness which, in its turn, has given birth to crippling debt

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[1] A frequently cited analysis of the economic crisis of SSA representing this tradition is the World Bank's Berg Report (World Bank (1981)).

repayments that are starving all sectors of the economy of the essential imported inputs. Faced with limited resources, African governments have reduced investments in infrastructure and in most cases even existing infrastructure is in disrepair for lack of necessary inputs for maintenance. This further contributes to the structural rigidities that blunt supply responsiveness of African agriculture, "Mkandawire (1989). Also Ndulu (1991) found strong evidence in support of the exogeneity of growth thesis in the context of SSA[2].

Faced with severe macroeconomic problems such as falling export earnings, worsening balance of payments, mounting debts, and declining economic growth; many African countries undertook economic reform programs, almost all of them assisted by multilateral and bilateral donors. In 1979 the World Bank introduced the concept of Structural Adjustment Lending (SAL) and the closely related Sectoral Adjustment Lending (SECAL) in order to help countries experiencing difficulties in adapting to external shocks, to phase out the initial cost of the stabilization part of adjustment while implementing appropriate policy and institutional reforms aimed at making the economy more flexible and strengthening its capacity for adjusting relatively more efficiently and easily to future shocks (World Bank (1985)).

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[2] The official African view at the time also emphasized the role of external factors such as world recession, falling commodity price, rising interest rates and debt burden, as well as drought, as the major factors responsible for Africa's economic crisis (Lagos Plan of Action (1980), O.A.U.).

During the 1980s, participation in the SALs programs by the countries of SSA has been quite substantial[3]. The SALs and SECALs policy prescriptions strongly emphasize the adoption of outward-oriented development strategy, especially export expansion as the primary channel for eliminating the balance of payments and debt problems. Considerable and recurrent nominal devaluations, macroeconomic retrenchment, and foreign trade and institutional reforms were the main vehicles for eliminating real overvaluation and creating a structure of incentives consistent with this strategy.

In addition to the controversy regarding the relative influences of the domestic policies in the economic crisis of SSA, there has been another closely related debate regarding the effectiveness of the Bank-supported structural adjustment reforms. In section 2 of this paper we will analyze in some details the initial conditions- in terms of economic performance and policy stance- that prevailed in the 1970-80s; this is the period that preceded the onset of the economic crisis in the first half of the 1980s. This second period has been the decision period concerning Bank-assisted structural adjustment programs by many of the SSA member countries of the Bank. The main objective of the analysis of these two periods will be to address the issues regarding the causes of the crisis, as well as the determinants of the decision to participate in the reform program.

Also in this section we will compare economic performance before and after the implementation of the program, where the following five indicators are

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[3] By FY 1988, the share of SALs and the broadly similar Sectoral Adjustment Loans (SECALs) in Bank lending was almost 25%. Between 1979 and 1987, some 25 SSA countries received World Bank adjustment loans almost half of total SAL and SECAL lending (Oyejide (1990), table (2)) and Nooter and Stacy (1990). Also Deng (1988), among others, contains a review of adjustment experiences in Africa in the 1980s.

considered: rate of growth of GDP, ratio of saving to GDP, ratio of investment to GDP, ratio of export to GDP, and domestic inflation. Following Corbo and Rojas (1991), we compare the value of the performance indicator in 1985-89[4] --a period after adjustment was initiated-- with performance in 1981-84--the decision period, for three groups of countries: early intensive adjustment lending (EIAL), countries that have received two or more SALs or three or more adjustment loans (SALs or SECALs), starting in 1985 or before; other adjustment lending (OAL) countries that started a program after 1985 or received fewer than two SALs or fewer than three adjustment loans in 1985 or before; and no adjustment lending (NAL), countries that have received nonadjustment loans.[5] In this paper we also introduce a further disaggregation in this paper where we compare performance between the above comparators within SSA and for the entire of the low income

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[4] 1985-89 (or 1986-89) is argued to be the appropriate period to assess the effect of structural adjustment programs on economic performance. Examination of performance indicators one or two years after the initiation of an adjustment effort reveals little about the effectiveness of an adjustment program, since the first phase of reform will be dominated by the stabilization effort needed for establishing a credible macroeconomic environment, before structural reforms to improve resource allocation and restore growth can be started (see Corbo and Rojas (1991)).

[5] At the outset we are hasten to point out that while this classification process is based on rather objective criteria and therefore avoids subjective judgement, it does not, however, account for actual implementation of the programs. Strictly speaking, therefore, the above classification allows for testing the effectiveness of Bank-assisted adjustment lending rather than testing the effectiveness of the program themselves. To be able to do this the current classification should be augmented with a somewhat 'subjective' but informed criterion specifying the degree of program implementation. While this should be an important future extension to this research (Jones (1992)), in this study, however, we will assume that the present 'objective' classification criteria are adequate for 'approximately' assessing the effectiveness of the adjustment programs.

countries (LICs)[6].

While the before-and-after analysis of economic performance, that we intend to discuss in section 2 of this paper, should be useful in helping us understand what actually happened after implementation of the reform; it is not suitable, however, for addressing the ultimate question of whether or not the Bank-assisted reform programs have had significant effect on economic performance. Evaluating performance in adjusting countries requires measuring the marginal contribution of adjustment programs while controlling for other factors that affect performance; as well as explicitly taking account of the potential endogeneity of the decision to participate in an adjustment program, since the same non-program factors that influence performance in the pre-program period are likely to influence the participation decision. Drawing from recent advances in the literature on the effectiveness of training (e.g. Heckman and Hotz (1989)), we develop in section 3 of this paper a paradigm that addressed this 'selectivity bias problem' and produces two models, depending on the assumption regarding program participation. This allows for a rather robust identification of the marginal program effect on economic performance; and in the event that predictions of the two models are fundamentally incompatible, a formal test to discriminate between them is available. Section 5 concludes.

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[6] LICs are normally defined to be the group eligible for the World Bank IDA lending. In addition to these countries, we include six SSA middle income countries: Botswana, Cameroon, Congo, Cote d'Ivoire, Mauritius and Zimbabwe to the LICs group for the purpose of the analysis of this paper.

Table (1.1)
ECONOMIC STRUCTURE AND PERFORMANCE IN SUB-SAHARAN AFRICA

	1970-81	1982-85	1986-89
Real growth rates			
GDP	3.7	1.4	2.0
Exports	3.6	1.1	3.3
Share in GDP			
Agriculture	39.3	36.7	36.3
Manufacturing	20.1	22.0	21.7
Services	37.9	41.3	41.2
Share in Labor Force			
Agriculture	78.5	..	..
Manufacturing	7.8	..	..
Services	13.7	..	..
Rural population (% of total population)	79.6	74.4	71.2

Source: World Bank Data Bank (BESD)

Table (1.2)
SELECTED MACROECONOMIC INDICATORS FOR SUB-SAHARAN AFRICA

INDICATOR	1973-81	1982-85	1986-89
Investment to GDP ratio	21.5	18.7	17.1
Domestic Savings to GDP ratio	13.0	8.8	9.1
Resource Balance to GDP ratio	-8.3	-9.7	-8.0
Imports to GDP ratio	37.2	37.0	34.5
Debt Service to Exports ratio	9.6	18.4	26.4
REER (1980=100) 1/	95.5	113.5	89.4
Terms of Trade Index	106.3	91.6	80.8
Rate of change of CPI (inflation)	16.5	17.7	20.5
Black market exchange rate premium (%) 2/	128.9	221.9	90.9
Fiscal Deficit to GDP ratio	5.3	7.4	7.8
External Shock 3/	0.1	-5.3	-2.2
External Financing (net flows in 1980 US$mn)			
Total 4/	7830 (29%)	3839 (-28%)	4635 (25%)
Public	7136 (28%)	3357 (-30%)	4272 (31%)
Private	694 (55%)	482 (-13%)	363 (.03%)

Notes: 1/ Index of the period average exchange rate of the currency to a weighted geometric average of exchange rates for the currencies of selected partner countries and adjusted for relative price movements in national price of the home country and its partners. An increase in the index reflects an appreciation.

2/ Includes only Ethiopia, Ghana, Kenya, Malawi, Sudan, Tanzania, Zaire and Zambia.

3/ The total effect of external shocks as % of GDP is computed as the sum of the real interest rate effect and the terms of trade effect. The interest rate effect is calculated as -(r-rbase)*(debt/GDP)beg, where r is the real interest rate computed as (i-dp/p)/(1+dp/p); rbase is the average real interest rate of base period; it is the ratio of interest payments to total debt; interest payments are calculated by adding public interest payments to private interest payments; private interest payments are proxied by multiplying private debt by L (L equals three-month annualized LIBOR plus one percent); the private debt is estimated by subtracting public and publicly guaranteed debt from total debt; dp/p is "world" inflation (proxied by the percentage change of the GNP deflator of the US), and (debt/GDP)beg is the ratio of debt to GDP of the year preceding the beginning the end period. Debt data correspond to total disbursed guaranteed and non guaranteed debt. The effect of terms of trade is computed as [((PX/PXbase)-1)*(X/GDP)beg]-[((PM/PMbase)-1)*(M/GDP)beg], where PX and PM are the average export and import price indices deflated by US GNP deflator, respectively; PXbase and PMbase are the average price indices of the base period; X and M are exports of GNFS and imports of GNFS respectively; and (X/GDP)beg and (M/GDP)beg are the ratios of X and M to GDP respectively at the year preceding the begining of the end period. All the variables are denominated in current US dollars.

4/ The periods used are 1970-1980, 1983-1985 and 1986-1989 respectively. The figures in parentheses refer to average annual growth rates.

Source: World Bank (BESD), OECD 1990 Report, Pick's Currency Yearbooks.

2. THE DEMAND FOR ADJUSTMENT AND ECONOMIC PERFORMANCE IN SUB-SAHARAN AFRICA: A PRELIMINARY ANALYSIS

In this section we will provide a preliminary analysis of the possible determinants of the demand for Bank-assisted adjustment. Here we will review initial conditions in terms of policy stance and economic performance during the 1970s for the three groups of comparators (EIAL, OAL, NAL), from Sub-Saharan African countries (SSA), where the above three groups were selected according to the criteria explained in the introduction to this paper.[7]

2.1 The Determinants of the Demand for Adjustment

The main objective of the analysis of this sub-section is to examine whether or not there exits a systematic association (and perhaps causation) between the initial conditions in the 1970s and the response of the economies of the different comparators to the massive adverse exogenous shocks of the late 1970s and early 1980s; and hence between the former and the demand for, and implementation of, Bank-assisted economic reform on the part of the countries with the most unsustainable initial conditions.

Initial Conditions Prior to Reform (1970-80):

Table (2.1) provides a summary of economic conditions in the 1970s for the three groups of comparators. As we stated above, without loss of generality, we

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[7] The tables actually contain the same comparison for the low income countries (LIC) as well. To make the comparisons more focussed, we confine the analysis to the within SSA comparisons; but all the conclusions carry over to the case of LICs.

will confine ourselves for the remaining of this section to the analysis of comparisons within SSA. It is clear that EIAL and OAL have pursued more expansive macroeconomic policies than their NAL counterparts , with the fiscal deficit ratios to GDP averaging 6.6%, 3.6%, and 2.4%, respectively. Not surprisingly the rate of domestic inflation averaged 14.9% and 14.8% respectively for the first two groups, compared to 10.9% for NAL countries. Also the first two groups have been less conservative compared to the last one in terms of external debt policies. The stock of external debt as a ratio to GDP averaged 33.1% for EIAL, and 26.3% for OAL compared to 23.5% for NAL. The debt service ratios to export on the other hand, averaged 7.7% and 5.5% for the first and second group and only 3.8% for the NAL countries.

The external debt story is reflected on the comparators performances in terms of their resource balances. Over the period under consideration, domestic absorption ratio to GDP (the negative of the resource balance ratio) for the three groups averaged 10.6%, 13.6%, and 10.1%, respectively. Also over this initial 1970s period, the above "would be" adjusting two groups of countries did not adopt more export-oriented policies or achieve better export performance compared to the other group. While the real exchange rate index for the three groups ranged between 93 and 98, export GDP ratio averaged 30.2% for EIAL and NAL compared to only 21.0% for OAL. These comparisons provide a case against the relatively more expansive external debt policies adopted by the EIAL and OAL in the period prior to reform.

Perhaps the most significant aspect of the initial conditions that set NAL countries from the other two groups is the record of growth and the implied productivity of investment. While the NAL countries managed to achieve an annual average rate of growth of 6.0% over the 1970s decade, the EIAL and OAL grew by

only 3.7% and 3.2%, respectively. There is no significant difference among the three groups, however, in terms of aggregate investment expenditure; with investment to GDP ratio averaging 24.7% in EIAL, 20.5% in OAL, and 21.1% in NAL. Clearly the EIAL and OAL were substantially outperformed by NAL countries in terms of real economic growth despite the relatively comparable investment ratios across the three groups. The EIAL and NAL countries were relatively similar regarding aggregate domestic saving, and both of them have been more successful than OAL on this score with the average saving ratio equal 16.1% and 12.8% for the first two groups compared to only 6.4% for OAL countries.

The above analysis suggests that EIAL and OAL countries could have suffered from rather low investment productivity prior to reform compared to the NAL group of countries. It has been argued that the rather sluggish growth in SSA despite colossal investment, may be attributed to low level of capacity utilization as opposed to capacity growth, driven by investment. Given the imperfect substitutability between imported intermediate goods and domestically produced goods in most of the economies of SSA, the level of imports could be a reasonable approximate measure for capacity utilization in SSA (Ndulu (1991)). According to table(2.2) this justification may be a valid explanation for the case of OAL with an average import to GDP ratio at 34.7% during the 1970s, but it cannot explain the low growth performance in the EIAL countries compared to its NAL counterparts with the average import ratio at 40.8% for the first group and sufficiently close at 40.3% for the second.

Exogenous Shocks, Policy Stance and the Adoption of Reform (1981-84):

The above analysis shows that the group of Sub-Saharan African countries that undertook the Bank-assisted adjustment have in fact entered the 1980s decade

with relatively weaker economies. These countries did not fare well compared to the NAL countries in terms of: (i) actual growth performance as well as the potential for higher growth in the future; (ii) sustainability of external finance and external debt strategy; and (iii) the ability to control excess aggregate demand and achieve internal balance. In light of these findings, it is natural that the massive exogenous shocks that dominated the late 1970s and the first half of the 1980s, have had a much more devastating impact on the economies of the EIAL and OAL countries of SSA than those of the NAL countries.

Table (2.3) shows the magnitudes of the terms of trade, foreign interest rate, and total external shocks in: 1981-84 compared to 1970-80, 1985-89 compared to 1970-80, and 1985-89 compared to 1981-84. Focusing our attention on the first comparison for the purpose of this discussion, we note that EIAL and NAL receive similar and much bigger negative external shocks compared to the OAL group. The magnitude of the aggregate shock relative to GDP was -15.4% and -16.4% for the first two groups, respectively; this is almost twice the total negative shock sustained by the OAL countries. For all of the three groups the collapse of the terms of trade for SSA has been the factor with the most devastating effect, it accounted for 88% of the total shock for the case of EIAL countries, 83% for OAL, and 93% for the NAL group.

Economic performance for all of the three groups is provided in table(2.4). The EIAL countries of SSA experienced a dramatic decline in real GDP in 1981-84 where it grew by only 0.1% per year compared to an average of 3.7% achieved for the previous period. OAL basically maintained its previous period growth level of 3.2% per annum. The rate of growth in the NAL countries, on the other hand, declined to 4.5% per year over the first half of the 1980s, this is lower than the previous period average but still high compared to the other two groups.

Both of EIAL and NAL experienced reductions in the second period by 26% and 14%, respectively, in their investment ratio; and by 39% and 17% in their saving ratio. The OAL countries of SSA, however, managed to achieve a slight increase in its investment ratio by about 5% in the same period, while its saving ratio declined by only 8%.

Furthermore, the NAL countries had a clear edge over the other two comparators over the second period in terms of domestic inflation and export performance. The rate of domestic inflation declined for NAL from an annual average of 10.9% in the first period to a single digit average at 8.3%, while the export ratio increased from 30.2% to 32.9%. The reverse happened for the EIAL and OAL countries. Between the two periods, inflation increased from an annual average of 14.9% to 21.0% for EIAL and from 14.8% to 24.5% for OAL. Also exports as a ratio to GDP, declined from 30.2% to 27.7% for the first group; and from 21.0% to 19.6% for the second.

Despite the similarity in terms of the external shocks experienced by EIAL and NAL countries of SSA, economic performance in the last group has been uniformally superior compared to the first. Also despite receiving twice as much negative external shock compared to OAL countries, the NAL group has fared better especially in terms of domestic inflation and export performance. An interesting question to consider is whether this happened in spite of important reform-oriented policies on the part of EIAL and OAL countries or whether the policy stance taken by these countries in fact was not significantly changed from those of the 1970s? Table (2.2) provides a summary of the evolution of policy stance by the three groups of countries over the 1970-89 period.

According to the above table EIAL countries of SSA have actually appreciated quite considerably over 1981-82 and 1983-84, where the real exchange

rate index increased from 93.8 in 1970-80 to 120.3 and 126.3, respectively. This leaves EIAL to be more appreciated than NAL countries which experienced a rise in the real exchange rate from 98.0 in 1970-80 to 106.7 and 117.2 in the two following periods. Given the much weaker initial conditions (in 1970-80) for the EIAL countries, and the change in the fundamentals as reflected by the sizable adverse exogenous shocks that impacted these countries, it is clear that these EIAL countries might have experienced considerable overvaluation over the 1981-84 period. Therefore, the observed decline in exports from EIAL countries over this period is consistent with the real exchange rate policy adopted by these countries over the period. This analysis also applies to the decline of OAL exports even though real appreciation is much smaller in this group, where the real exchange rate appreciated by only 16% between 1970-80 and 1983-84.

In terms of fiscal policy, 1981-82 has been a period of continued expansive macroeconomic policy on the part of all groups. Compared to 1970-80, the fiscal deficit GDP ratio increased by 62% in EIAL, 89% in OAL, and more than 200% in NAL. The fiscal expansion continues over the following period for OAL and NAL; where between 1981-82 and 1983-84, the deficit ratio increased by 10% for OAL and 48% for NAL. The EIAL countries on the other hand managed to reduce its fiscal deficit by an average of 32% between the two periods, this is still, however, higher than the 6.6% ratio registered for 1970-80.

Even though the fiscal deficits in all of the three groups of countries might not have been sufficiently brought under control over the 1981-84 period, it appears that aggregate demand has been steadily retrenching in EIAL and NAL. The domestic absorption ratio for EIAL countries decreased from 10.6% in 1970-80 to 8.4% in 1981-82, and to 4.5% in 1983-84. For the NAL the ratio it decreased from 10.1% in 1970-80 to 8.6% in 1981-82, and it turned negative if very small

at -0.2% in 1983-84. Aggregate demand policy in the OAL countries, however, has been quite expansive over the 1981-84 period where the absorption ratio deteriorated from 13.6% in 1970-80 to an average of 18.0% for the 1981-84 period. The reduction of aggregate demand in both of EIAL and NAL countries has been partly achieved by import compression, where between 1970-80 and 1981-84, the import ratio declined by 16% for the first group and by 8% for the second. The import ratio in OAL on the other hand, increased by 8% over the two periods, reflecting the continued expansion in aggregate demand in these countries.

We emerge from the above discussion with the following broad conclusions: (i) the adverse exogenous shocks that impacted most of LDCs, and especially those of SSA, over the first half of the 1980s, have certainly been the trigger that pushed the economies of EIAL and OAL countries of SSA to the brink of crisis and to the subsequent adoption of Bank-assisted type reforms; (ii) the exogenous shocks by themselves, however, do not explain either of the above two developments. The interaction between the shocks and the initial conditions that prevailed in the 1970s is key to understanding why these countries embraced reform; (iii) except for a belated effort by EIAL countries at controlling fiscal expansion, others continued to produce large fiscal deficits during this first stage of adjustment. After 1983, however, as external finance became increasingly difficult[8], both of EIAL and NAL countries made considerable efforts at reducing aggregate demand, mainly through import compression; (iv) over this period the adjusting countries of SSA (EIAL and OAL) could not distinguish themselves from the NAL countries in terms of real depreciation, while the EIAL and OAL suffered from a dramatic rise in inflation, NAL managed to reduced its inflation to single digits.

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[8] See table (1.2) of the previous section.

2.2 A Preliminary Look at Economic Performance Before and After Adjustment

An assessment of the effectiveness of the reform program in improving economic performance in the adjusting countries-especially the EIAL group, is the ultimate objective of this paper. To address this question adequately, we need to estimate the marginal contribution of the program for given initial conditions, exogenous shocks, and the counterfactual policy stance that would have prevailed in the absence of the program. This will require a methodology of analysis that allows for endogenizing the participation decision itself. The endogeneity or the nonrandomness of program participation is sufficiently justified by the analysis of the above sub-section.

This question will be addressed in sections 3 and 4 in the context of a modified-control-group model.[9] For the remaining of this section we will do simple before and after comparisons of economic performances for each of the three groups of countries. The before and after approach gives a picture of what has actually happened after the implementation of the program; it does not however, answer the question regarding the effectiveness of programs. The main drawback of this approach is that it implicitly makes the implausible assumption of "other things equal". This is a nontrivial point because, for example, it is not clear whether the change in output growth after implementing the program can be attributed to the program or to the terms of trade or interest rate shocks.

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[9] The statistical model developed in section 3 of this paper explicitly considers two different sets of 'identification conditions' regarding program participation decisions and suggests formal tests for the validity of these assumptions.

The Post-Reform Economic Performance in SSA:

To compare the performance of EIAL, OAL and NAL countries before and after implementation of reforms, I analyze five indicators of economic performance -- real GDP growth, domestic investment to GDP ratio, saving to GDP ratio, export to GDP ratio, and domestic inflation -- in the three periods, 1970-80 (first), 1981-84 (second), and 1985-89 (third).

Table (2.4) shows that real GDP rose significantly for EIAL countries from an annual average of 0.1% in the second to 3.7% in the third, which reestablished the average set for the first period. OAL countries virtually maintained their pre-program performance, where real GDP growth declined by 0.1% in the third compared to the second and by 0.2% compared to the first. The NAL countries on the other hand, experienced continued economic decline where average annual real GDP growth came down from a high of 6% in the first period to 4.5% in the second and only 2.3% in the third.

The investment ratio declined steadily for all countries where between periods one and three it came down by 32% for EIAL, by 9% for OAL, and by 18% for NAL countries. The saving ratio also declined by 32% and 17% for EIAL and OAL respectively, between the two periods; the NAL countries on the other hand, increased its saving ratio by 17% between the same periods.

Compared to period two, EIAL countries managed to improve its export performance by almost 2 percentage points of GDP and came close to the 1970-80 average ratio of 30.2%. For the other two groups, the deterioration in export performance, however, could not be arrested; between the last two periods, the export ratio declined by 1.1 and 2.6 percentage points of GDP for OAL and NAL, respectively.

Finally, with respect to domestic inflation, NAL countries significantly outperform both of the EIAL and OAL countries in periods two and three; the EIAL countries, however, reduced its price inflation in the third period to levels comparable to the first period, while OAL countries' inflation did not improve between the last two periods.

External Shocks and Policy Stance:

In the previous analysis we discussed the magnitudes of the external shocks for each of the three groups between periods one and two. Compared to period one, all three groups received negative shocks in period three, albeit with a lesser extent than the shock of the early 1980s for EIAL and NAL countries. This implies that external conditions have been conducive to improved economic performance over the third period in these two groups of countries. Between the last two periods terms of trade improved by 1.7 and staggering 6.7 percentage points of GDP in EIAL and NAL countries, respectively. These terms of trade improvements were more than enough to account for the still rising cost of external borrowing which increased by 0.6 and 0.7 percentage points of GDP, respectively, for the above two groups. The terms of trade for OAL countries on the other hand, worsened by 2.5 percentage points of GDP to add to a 0.8 percentage point foreign interest cost for these countries.

In the third period the EIAL countries clearly distinguished itself from others in SSA in terms of fiscal policy and real depreciation. In comparison to period two, the average annual real exchange rate in period three is 30% depreciated in EIAL countries, compared to only 13% for OAL countries and a 5% appreciation for NAL countries. NAL countries also cut down on its fiscal

deficit ratio in period three by 3.2 and 0.8 percentage points of GDP relative to periods two and one, respectively; compared to an increase of 1.8 and 5.4 percentage points for OAL. The fiscal deficit ratio in NAL countries was still almost 6 percentage points of GDP higher in period three compared to the first, even though it came down by about 1.2 percentage points of GDP between the last two periods.

To recapitulate, the following broad conclusions can be stated: (i) the story so far is consistent with the argument that the early phase of the reform program (period two) which tends to be dominated by stabilization, is not likely to restore growth for EIAL and OAL countries of SSA. Economic growth, however, has been restored in EIAL countries after enough time has elapsed (period 3), and after the reforming economies have adjusted to the costs of the initial stabilization phase. As we explained above the present analysis does not answer the question regarding whether or not this can be attributed to the program effect; (ii) in addition to their relative success at resuming growth, EIAL countries also improved their export performance while exports from OAL and NAL countries continued to decline as a ratio to GDP; (iii) it appears that the considerable real depreciation achieved in EIAL countries may be related to its relatively superior export performance in the third period compared to that of NAL countries, since both of the two groups of countries experienced positive exogenous shocks of about the same magnitudes; (iv) the steady decline in investment as a ratio to GDP in all countries is explained by the less than proportionate rise in private investment, as public investment declined as part of the cut down in public expenditure necessitated by reduced external finance for NAL and to some extent OAL countries, or by program conditionality for the case of EIAL countries; (v) the failure of private investment to be forthcoming

could be attributed to at least two reasons. It may be because on aggregate, public investment in SSA actually crowded in rather than crowded out private investment, or because of credibility problems due to doubts on the part of the private sector regarding the adequacy and sustainability of reform (EIAL and OAL) or the prevailing policies (NAL); (vi) the increase in the import ratio in EIAL in the third period whereas it declined for the other two groups, is consistent with a relatively less binding external constraint for EIAL as reflected by the resource balance indicators; (vii) the improved growth performance in EIAL countries despite the decline in aggregate investment, could be explained by the enhanced capacity utilization (via increased imports) and investment efficiency achieved by these countries. The reduction of investment in this case could have a more significant effect in terms of allowing for higher private consumption, which should enhance the chances for sustainability of the reform; (vii) Even though our analysis supports the concern regarding the rising inflation in the adjusting countries of SSA (Chhibber (1991)); it nevertheless shows that countries that undertook deep reforms and stayed with it (EIAL), were able to reduce their inflation to the pre-shock levels after the steep rise associated with the initial cost of the stabilization part of the reform[10]; (ix) finally and as expected, the indicators of political stability and political pluralism of table (2.5) show the EIAL countries to be more politically stable on average compared to OAL countries both in SSA and in LICs in general. This finding supports the view that reforms are successful, when the programs are owned, actively explained and campaigned for by governments that are politically stable

[10] The fact that OAL countries of SSA received a large negative external shock in the third period compared to a positive shock for the EIAL group, may account for this difference.

(e.g. Corbo and Fisher (1991)).[11]

[11] Actually the evidence of table (2.5) has not been discussed above; however, this conclusion is fairly straightforward to obtain from the table.

Table 2.1: Initial conditions (period average, 1970–1980)

	External debt as % of GDP	Debt Service as % of exports	Real effective exch.rate	Fiscal deficit as % of GDP	Resource balance as % of GDP	Annual avg. rate of inflation	Real GDP growth	Domestic savings as % of GDP	Investment as % of GDP	Exports as % of GDP
EIAL										
LIC	46.5	8.7	97.9	9.0	-5.9	13.5	4.0	16.9	22.8	29.1
SSA	33.1	7.7	93.8	6.6	-10.6	14.9	3.7	16.1	24.7	30.2
OAL										
LIC	39.7	6.2	98.7	9.1	-10.2	13.7	3.2	8.1	18.3	18.0
SSA	26.3	5.5	93.1	3.6	-13.6	14.8	3.2	6.4	20.5	21.0
NAL										
LIC	23.8	6.7	97.5	4.6	-7.8	10.5	4.1	9.7	17.5	19.0
SSA	23.5	3.8	98.0	2.4	-10.1	10.9	6.0	12.8	21.1	30.2

Table 2.2: Selected indicators of policy stance

	Real effective exchange rate				Ratio of fiscal deficit to GDP			
	1970-80	1981-82	1983-84	1985-88	1970-80	1981-82	1983-84	1985-89
EIAL								
LIC	97.9	116.5	111.5	83.5	9.0	9.8	7.4	5.7
SSA	93.8	120.3	126.3	88.5	6.6	10.7	7.3	5.8
OAL								
LIC	98.7	104.3	111.7	81.2	9.1	8.8	9.8	8.2
SSA	93.1	106.8	108.8	94.4	3.6	6.8	7.5	9.0
NAL								
LIC	97.5	105.6	114.5	106.4	4.6	7.7	8.5	7.7
SSA	98.0	106.7	117.2	123.7	2.4	7.5	11.1	8.2

	Ratio of Imports to GDP				Ratio of resource balance to GDP			
	1970-80	1981-82	1983-84	1985-88	1970-80	1981-82	1983-84	1985-89
EIAL								
LIC	38.6	33.5	29.8	31.9	-5.9	-9.2	-4.1	-4.2
SSA	40.8	36.1	32.1	34.2	-10.6	-8.4	-4.5	-5.3
OAL								
LIC	35.5	36.9	35.0	30.8	-10.2	-16.8	-15.2	-10.6
SSA	34.7	38.4	37.0	30.9	-13.6	-18.7	-17.5	-11.8
NAL								
LIC	32.9	34.8	29.5	27.4	-7.8	-16.1	-10.0	-4.2
SSA	40.3	40.5	33.7	32.7	-10.1	-8.6	0.2	-2.3

Table 2.3: External Shocks

	1981–84 compared to 1970–80			1985–89 compared to 1970–80			1985–89 compared to 1981–84		
	Terms of Trade	Real Int. Rate	Total Shock	Terms of Trade	Real Int. Rate	Total Shock	Terms of Trade	Real Int. Rate	Total Shock
EIAL									
LIC	-10.6	-2.0	-12.6	-14.0	-3.2	-17.2	1.6	-0.5	1.1
SSA	-13.6	-1.8	-15.4	-13.4	-3.4	-16.8	1.7	-0.6	1.1
OAL									
LIC	-8.6	-1.6	-10.2	-9.7	-3.6	-13.3	-1.7	-0.8	-2.5
SSA	-6.9	-1.4	-8.3	-9.8	-3.2	-13.0	-2.5	-0.8	-3.3
NAL									
LIC	-18.7	-0.9	-19.6	-9.5	-2.0	-11.5	3.1	-0.6	2.5
SSA	-15.3	-1.1	-16.4	-8.5	-2.3	-10.8	6.7	-0.7	6.0

Notes: The total effect of external shocks as % of GDP is computed as the sum of real interest rate effect and the terms of trade effect. The interest rate effect is calculated as $-(r-r_{base})*(debt/GDP)_{beg}$, where r is the real interest rate computed as (i-dp/p)/(1+dp/p); r_{base} is the average real interest rate of the base period; it is the ratio of interest payments to total debt; interest payments are calculated by adding public interest payment to private interest payments; private interest payments are proxied by multiplying private debt by L (L equals three-month annualized LIBOR plus one percent); the private debt is estimated by subtracting public and publicly guaranteed debt from total debt; dp/p is "world" inflation (proxied by the percentage change of the GNP deflator of the US), and $(debt/GDP)_{beg}$ is the ratio of debt to GDP of the year preceding the beginning of the end period. Debt data correspond to total disbursed guaranteed and nonguaranteed debt.
The effect of terms of trade is computed as $[(PX/PX_{base})-1)*(X/GDP)_{beg}]-[(PM/PM_{base})-1)*(M/GDP)_{beg}]$, where PX and PM are the average export and import price indices deflated by the US GNP deflator, respectively; PX_{base} and PM_{base} are the average price indices of the base period; X and M are exports of GNFS and imports of GNFS; and $(X/GDP)_{beg}$ and $(M/GDP)_{beg}$ are the ratios of X and M to GDP respectively of the year preceding the beginning the end period. All the variables are denominated in current US dollars.

Table 2.4: Country Performances

	Real GDP growth			Investment to GDP			Domestic Saving to GDP		
	1970-80	1981-84	1985-89	1970-80	1981-84	1985-89	1970-80	1981-84	1985-89
EIAL									
LIC	4.0	0.1	3.7	22.8	18.4	16.2	16.9	11.8	10.2
SSA	3.7	0.1	3.7	24.7	18.4	16.9	16.1	9.9	11.0
OAL									
LIC	3.2	2.1	3.2	18.3	19.3	19.7	8.1	3.3	7.7
SSA	3.2	3.1	3.0	20.5	21.5	18.7	6.4	5.9	5.3
NAL									
LIC	4.1	3.1	2.2	17.5	19.1	17.7	9.7	6.0	10.2
SSA	6.0	4.5	2.3	21.1	18.2	17.3	12.8	10.6	15.0
	Exports to GDP			Export Shares			Inflation		
	1970-80	1981-84	1985-89	1970-80	1981-84	1985-89	1970-80	1981-84	1985-89
EIAL									
LIC	29.1	27.3	28.2	3.4	3.2	..	13.5	51.6	170.4
SSA	30.2	27.7	29.6	3.5	4.0	..	14.9	21.0	15.0
OAL									
LIC	18.0	19.4	19.2	0.8	2.3	..	13.7	22.6	23.5
SSA	21.0	19.6	18.5	0.8	0.7	..	14.8	24.5	24.6
NAL									
LIC	19.0	18.1	23.0	2.2	2.4	..	10.5	7.7	6.7
SSA	30.2	32.9	30.3	0.9	0.7	..	10.9	8.3	5.0

Table 2.5: INDEX OF POLITICAL PLURALISM

		1971-80	1981-84	1985-86
EIAL				
	LIC	5.1	5.1	5.1
	SSA	5.2	5.0	5.4
OAL				
	LIC	5.7	5.7	6.0
	SSA	6.0	5.9	6.2
NAL				
	LIC	5.1	5.4	5.3
	SSA	5.4	5.6	5.6

Notes: The index is a simple average of two indeces on political rights and civil liberties as reported in Gastil (1987) The political rights index measures the extent of a fully competitive electoral process. The civil liberties index measures the extent of freedom of expression of rational political opinion. In each scale a rating of (1) is the most free and (7) the least free.

3. ANALYSIS OF COUNTRY PERFORMANCE: MODIFIED CONTROL-GROUP APPROACH

The above analysis while being useful in providing a view of the facts regarding the differences in economic performance and related exogenous factors and policy stance between program and non-program countries; it is not helpful, however, in addressing the main question: can these differences, if any, be attributed to the marginal effects of the reform program.

An adequate framework for estimating the marginal contribution of the program effect should adjust for initial conditions, changing exogenous non-program factors, in addition, the methodology must explicitly consider policy reactions and hence the endogeniety of policy instruments, and more importantly this methodology should allow for correction of the "sample selectivity" bias that results from the non-randomness of the decision to undertake reform.

The problem of selectivity bias arises in evaluating the impact of economic reform on average economic performance (real growth, say), when the average performance of the program countries would differ from that of the non-program countries even in the absence of program. Formally, if y_{it}^{*} stands for economic performance of country i at period t in the absence of program, and if d_i is an indicator variable equal to one if i is a program country and equal to zero otherwise; then selectivity bias implies the following:

$$E(y_{it}^{*} \mid d_i = 1) \neq E(y_{it}^{*} \mid d_i = 0).$$

The above interpretation of the selection bias problem borrows from the

literature on the impact of social programs.[12] The strand of the literature that exploits non-experimental data (as in our case) has produced rather non-uniform predictions regarding the effectiveness of social programs. In a recent paper analyzing the effectiveness of training programs, Heckman and Hotz (1989) argue that "evidence of striking differences in estimates produced from alternative non-experimental estimators merely confirms the existence of systemic differences between trainees and comparison group members in characteristics affecting outcome measures", and the different non-experimental estimators make different assumptions about the distribution of these differences. Based on this Heckman and Hotz (1989) then go on to develop a family of models that resolve the selection bias problem under varying identification conditions. They also develop formal tests for choosing among alternative non-experimental estimators, subject to data availability.

In what follows we will use the Heckman and Hotz (1989) paradigm to develop two types of estimators that permit identification of program effect under two different sets of assumptions. Our model also draws on Rojas and Servin (forthcoming) which incorporates a policy reaction function in the standard selection bias problem studied in the social program literature.

We start by stating the basic specification for the macro economic target variable in equation (1) below.

$$y_{is} = \alpha_0 + X_{is}' \alpha_1 + W_{is}' \alpha_2 + v_i + e_{is} \qquad s \leq K \qquad (1A)$$

[12] For example Heckman and Hotz (1989) and the literature cited therein.

$$y_{it} = \alpha_0 + X'_{it}\alpha_1 + W'_{it}\alpha_2 + \alpha_3 d_i + v_i + e_{it} \qquad t > \kappa \tag{1B}$$

where κ is the decision period pertaining to program participations X_{it} is a κ-element vector of the macroeconomic policy instruments that would be observed by country i in period t under the circumstances of non-participation posture, W_{it} is an M-element random vector of the world variables not related to program participation and relevant to country i and period t, d_i is a dummy variable that takes the value of unity if the country participates in the Bank-supported reform and zero otherwise, the prime (') sign denotes the transpose of a vector, v_i is a time invariant country specific random effect, and e_{it} is an iid disturbance shock uncorrelated across time and across individual countries.

In equation (1), the target variable y_{it} is a function of (a) the value of the selected policy instruments that would have occurred assuming non-participation (a counterfactual), X_{it}; (b) a change in selected world economic conditions, W_{it}; (c) the total effects of program participation, d_i; and (d) a range of unobservable random shocks, v_i and e_{it}.

The policy vector x is generated according to the following reaction function:

$$\Delta X_{it} = [Y^d_{it} - Y_{i,t-1}]' \delta_1 + W'_{it}\delta_2 + \pi_i + \epsilon_{it} \tag{2}$$

where Y^d_{it} is the desired value of the matrix Y_{it} of the individual economic

indicators, $y_{it'_s}$; n_i and ϵ_{it} are random effects as in (1) above, following Rojas and Serven (forthcoming), e_{it} and ϵ_{is} are allowed to have a non-zero correlation for i = j and t = s, but are assumed uncorrelated in all other cases, in turn, v_{it} and n_i, can be correlated for any given i.

This reaction function reflects policy makers' responses to perceived disequilibria in the target variables. It shows that a change in policy instruments between any two periods is a function of the difference between the desired value of the target variable in the current period and its actual value in the preceding period, a change in the world economic environment, a time invariant country specific random shock n_i and a disturbance term ϵ_{it}.

The vector of the coefficients of responsiveness to target disequilibria is δ. One potential limitation of this model is that the reaction function can be highly unstable and in the extreme case deriving the counterfactuals becomes insoluble problem (e.g. Goldstein and Montiel (1986)).

Since Y_{it}^d is unobservable, we assume that the desired target levels depend on last period policy stance and actual target levels, in addition to current exogenous world environment; this allows us to write the reaction function in the following unrestricted reduced form:

$$X_{it} = b_0 + W'_{it}\, b_1 + X'_{i,t-1}\, b_2 + Y'_{i,t-1}\, b_3 + n_i + \epsilon_{it} \qquad (3)$$

The model is completed by adding a framework describing the decision by countries to undertake economic reform. The participation decision can be specified in terms of an index function framework. Let the index, IN_i be a function of both observed (Z_i)--which may include all of the elements in X_i, and unobserved (μ_i) variables and write:

$$IN_i = f(Z_i) + \mu_i \tag{4}$$

where f(.) is an unspecified function of Z_i. Then the i^{th} country's program status is given by:

$$d_i = \begin{cases} 1 & \text{if and only if } IN_i > 0 \\ 0 & \text{otherwise} \end{cases} \tag{5}$$

Now abstracting from (4) and (5) for a moment, we subtract (1A) from (1B) and use (3) to obtain the following estimating equation for program effect:

$$\begin{aligned} y_{it} - y_{is} &= (W_{it} - W_{is})'\beta_1 + (X_{i,t-1} - X_{i,s-1})'\beta_2 \\ &+ (Y_{i,t-1} - Y_{i,s-1})'\beta_3 + \beta_4 d_i \\ &+ (e_{it} - e_{is}) + \beta_5(\epsilon_{it} - \epsilon_{is}) \end{aligned} \tag{6}$$

where as before $t > K$ and $s < K$ and K is the decision period pertaining to program participation.

The above equation, which allows the elimination of the permanent random

shocks v_i and η_i, provides the structure that we will combine with the sets of identification conditions in order to derive the two estimators of the program effect. Note that since t-1 > s, the presence of e_{it} and ϵ_{is} in (6) implies that the terms $(Y_{i,t-1} - Y_{i,s-1})$ and $(X_{i,t-1} - X_{i,s-1})$ are endogenous. This rather classical source of endogeniety should also be corrected for along with the one caused by the selection bias problem.

Before we go on to discuss individual estimators let us make the general assumption that the dependence between e_{it} and d_i arises because of the dependence between μ_i and e_{it}. More formally

$$E(e_{it}|d_i, X_{it}, W_{it}) \neq 0 \quad \text{and}$$

$$E(e_{it}|d_i, X_{it}, W_{it}, Z_i) \neq 0 \quad \text{but}$$

$$E(e_{it}|d_i, X_{it}, W_{it}, Z_i) = E(e_{it}|X_{it}, W_{it}, Z_i) \tag{7}$$

This case is referred to by Heckman and Hotz (1989) as "selection on unobservables".[13]

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[13] Here we don't consider the "selection on observables" case which is not very relevant to the problem at hand. See Heckman and Hotz for more details on this.

A. First Difference Estimator

This estimator is obtained by adding to equation (6) and assumption (7) above the assumption that: the conditional expectation of the difference in a pre- and post- program set of e_{it}'s does not depend on d_i. That is assuming the following condition holds:

$$E(e_{it} - e_{is}|d_i, \hat{X}_i, W_i) = 0 \qquad (8A)$$

for all t, s, where t > k > s, and $\hat{X}_i$ is an instrumented vector of X_{it}'s.[14] For this model consistent estimates of the impact of program can be obtained by estimating equation (6) using 2SLS or IV methods with d_i and $(W_{it} - W_{is})$ taken as the exogenous regressors.

B. The Modified-Control-Group Estimator

This approach requires an assumption giving specific functional specification to the program status in equation (4). In addition to equation (6) and condition (7) assume that:

$$f(Z_i) = Z_i\gamma$$

$$\mu_i \sim iid \text{ from the distribution } F(\beta_i) = Pr(\mu_i < \beta_i)$$

[14] Specification (8A) can be motivated in terms of our model by assuming that selection occurs on the permanent component, v_i of the composite disturbance term $(v_i + e_{it})$ of equation (1) above, and e_{it} is a zero non-random component independent of e_{is} for t > k > s.

and $E(\mu_i|Z_i) = 0$ (8B)

Now assumption (8B) allows us to write:

$$Pr(d_i = 1|Z_i) = E(d_i|Z_i) = 1 - F(-Z_i\gamma) \quad (8B')$$

The probability statement (8B') provides a basis for estimating (via a probit model ala Corbo and Rojas (1991), for example)[15] an instrument $\hat{d}_i = 1 - F(-Z_i\hat{\gamma})$ for d_i. The second step is to estimate equation (6) using 2SLS or IV as in (A) above but with $\hat{d}_i$ (rather than d_i) and $(w_h - W_h)$ taken as exogenous regressors.

Note that in case (A) the identification condition is an assumption about the moments of the performance equation's disturbance term. In this case identification of marginal program effect is possible without the need to specify the decision rule. On the other hand, estimator (B) requires specific functional and distributional specification of the program participation decision process, but the random disturbance shocks to performance are allowed to be more general. In the following section we will estimate both models. In my view, these two estimators should provide an opportunity for assessing the robustness of our results. At any rate, in the following section, in addition to testing for conventional endogeniety as suggested by the model, we will attempt to formally test for the validity of both assumptions using pre-program data.

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[15] See also Barrow et al (1981), and Heckman (1979).

4. EMPIRICAL RESULTS

In this section, we estimate the modified-control-group of section 3 above and use it to analyze the marginal effect of the reform program on economic performance: (a) in the EIAL countries of SSA relative to other countries of SSA and (b) in the EIAL low income countries relative to other LICs.[16] In terms of time two possible periods can be considered: 1985-89 with 1970-80 and 1985-89 with 1981-84, in this paper only the second will be considered. A brief overview of the data is provided in Appendix A below.

Estimation of equation (6) above fails to produce any significant coefficients for all configurations: LIC or SSA, TSLS or OLS, and with assumption (8A) or (8B). The difficulty to find any meaningful relationship in a specification where all variables are in differenced form as in (6) above, arises if the data series of the variables involved differ in terms of their stationarity properties. In this case a specification that encompasses both levels and differences may be more appropriate for the underlying data generating processes.

To generate such specification we make a slight change to the specification of the policy reaction function in (2) by assuming that time invariant systematic differences among countries are <u>fixed</u> rather than <u>random</u>, and that differences take place across regions (e.g. Latin America (LAC), Asia, SSA, or middle income countries (MIC)). Hence we replace, n_i, in (3) by a regional dummy, $REGDUM_i$. Now letting t = 1985-89, and s = t - 1 = 1981-84, and using (3) (with n_i replaced by $REGDUM_i$) in (1A) and (1B) as before, we can write the following version of

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[16] EIAL country from this group is almost identical to the EIAL from SSA since it includes only Bolivia and Pakistan as non-Sub-Saharan Africa LICs.

equation (6) above:

$$y_{it}-y_{is} = \beta_o + W'_{it}\beta_1 + (W_{it}-W_{is})'\beta_2 + X'_{is}\beta_3$$

$$+ Y'_{is}\beta_4 + \beta_5 d_i + \beta_6 REGDUM_i$$

$$+ (e_{it}-e_{is}) + \beta_7 \epsilon_{it} \qquad (6')$$

In appendix (B) of this paper, and based on specification (6') above, I conducted formal sequential specification tests for conventional endogeniety and assumptions 8(A) and 8(B) regarding the participation decisions. The details of the tests are provided in the appendix. The results of the estimation for the chosen models are reported in tables (B.4.1.), (B.4.2) and (4.3), while tables (4.1) and (4.2) contain the probit model estimation results for LIC and SSA respectively.

4.1 The Econometric Results

Starting with the analysis of the program participation status function (equation (8B')), tables (4.1) and (4.2) provide the corresponding maximum likelihood probit estimates for LICs and SSA's comparisons, respectively. The tables also present the pseudo-R^2, defined by McFadden(1974) as a measure of the goodness of fit of the ML probit estimation. The decision period is 1981-84 which witnessed the first five years of intensive policy dialogue between the Bank and member countries, regarding Bank-supported reform programs, and subsequent adoption of reform by these countries. Broadly following the preliminary analysis of section 2 above, the following variables are assumed tc

be important determinant for a country's decision to participate in an adjustment program in the period 1981-84. These variables are the magnitude of the external shock in 1981-84 (period two) relative to 1970-1980 (period one), EXT21; the index of political pluralism at period two, POL2; the change in the ratio of total debt to GDP between period one and two, DEBT21; the level of inflation in period two, INFL2; the export to GDP ratio in period two, X2; the rate of GDP growth in period two, GDP2; the change in the investment GDP ratio between periods one and two, GDI21; the change in fiscal deficit GDP ratio between periods one and two, DEF21; the real effective exchange rate in period 2, REER2; and dummy variables for Asian and Latin American countries.

The full model is estimated for the LICs comparisons; while only a small subset of the above variables were estimated for the SSA comparisons, given the relatively smaller number of observations available in this case. In both models, all the coefficients have the appropriate signs and a large number of them are statistically significant. For the case of LICs; a higher foreign debt and inflation, a low investment ratio, and a stable political environment, are factors with the most significant effect on the decision to undertake reform. The corresponding factors for the SSA case are; period two GDP growth, a change in investment and in debt ratios, and political stability. Also the estimated participation indicators in both models, successfully predicted actual country status, see appendix figures (B.4.1) and (B.4.2).

In the second stage the fitted value of the dependent variable from the maximum-likelihood probit equation $(\hat{d}_i)$ is used as an instrument for d_i in performance equation (6')--except for the case of real GDP growth in LICs where

d_i rather than $\hat{d}_i$ was used (as suggested by the specification tests of appendix B). Because we are working with cross sectional data, the White heteroskedasticity-robust standard errors were calculated in this estimation.

The results of the estimation of equation (6') for LICs and SSA are reported in appendix tables (B.4.1.) and (B.4.2.), respectively. Table (4.3) presents the estimated marginal effects of the program for both groups. In addition to the above variables described in Section 2 above as potential candidates for the estimation of equation (6'), we introduce an internal shock variable -reflecting the impact of natural conditions on domestic food production-as a regressor (see appendix A for details). Moreover, because of our small sample size, substantially statistically insignificant effects in the panel model for the SSA countries, have been eliminated from the final regression equation.

After controlling for external and internal shocks, the prevailing political atmosphere, and the initial conditions and policy stance followed in the pre-program period by each country; we find that adjustment programs do not seem to have had a statistically significant marginal effect on the growth of EIAL countries of SSA compared to the rest of SSA, while there is some evidence (a 9% significance level) that it increased real growth by 1% in program LICs relative to other nonprogram LICs.

The estimates of table (4.3) regarding saving, show a marginally significant and negative marginal program effect for the SSA comparison, where adjustment programs were estimated to have reduced saving by 8.3 percentage points of GDP; no significant marginal program effect is found for the LICs' case, however. In the case of investment, the adjustment programs appear to have

caused a statistically significant drop in the investment GDP ratio in the EIAL countries of SSA vis-a-vis either of other SSA or the nonadjusting LICs; where the marginal decline was estimated at 8.4% for the first case and at 5.3% for the second.

The combination of the above result on investment and the estimated nonsignificant marginal effect of adjustment on economic growth (at least for the SSA comparison); imply that the perceived increase in the efficiency of investment supposed to be generated by the program has not been sufficient, in order to counterbalance the ensuing decline in investment, and hence to restore economic growth. Two further implications of these two findings are that more attention should be given to private sector perception about the credibility of reforms, and hence its likely response to policies designed to enhance private sector investment; and second, if on the aggregate, public sector investment expenditure has in fact crowded-in rather than crowded-out private investment in SSA, adjustment programs have to allow for increased public investment in physical and human capital, while continuing to require the liquidation or curtailment of low efficiency public (and private) investment programs.[17]

The estimated marginal effect of the program on export performance is positive and highly significant for the within SSA comparison, while the effect is still positive for the LICs its only marginally significant (12% significance level) , however. After controlling for other factors, adjustment program were estimated to have caused the exports of the EIAL countries of SSA to increase by 8% compared to other SSA and by 2.6% compared to nonadjusting LICs.

The last performance indicator to be considered is inflation, which

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[17] The evidence on the response of investment to economic policy is analyzed in Serven and Solimano (1991).

according to the results of table(4.3) did not seem to be significantly influenced by adjustment. Even though the estimated marginal effect of adjustment has a positive sign, it is highly insignificant for the case of LICs and only marginally significant (at 22% significant level) for the SSA comparison.

Finally, according to tables (B.4.1.) and (B.4.2.) -which report the estimates of the full performance model of equation (6') above- most of the factors reflecting initial conditions, policy stance, external and internal shocks, and political conditions; have had significant effects that are consistent with prior expectation. The factor that has been consistently significant is the index of political stability, where in both of the two comparisons; political instability were shown to reduce growth, investment, saving and exports, and to increase inflation.

Table (4.1)

MAXIMUM LIKELIHOOD PROBIT ESTIMATES OF THE STATUS PARTICIPATION EQUATION

Low income countries

Variable	Coefficient	Std. Error	t-Stat	2-Tail Sig.
GDP2	-18.073	10.984	-1.645	0.109
GDI21	-11.455	5.295	-2.164	0.037
POL2	-0.230	0.132	-1.736	0.091
DEBT21	3.024	1.617	1.869	0.070
EXT21	-2.111	1.719	-1.228	0.228
INFL2	2.000	1.125	1.777	0.084
X2	-2.456	2.213	-1.110	0.275
DEF21	8.235	7.604	1.083	0.286
LAC	-6.002	3.893	-1.541	0.132
ASIA	0.979	0.964	1.015	0.317

Note: Log likelihood = -15.497 ; pseudo R squared = 0.48

Table (4.2)

MAXIMUM LIKELIHOOD PROBIT ESTIMATES OF THE STATUS PARTICIPATION EQUATION

Sub-Saharan Africa

Variable	Coefficient	Std. Error	t-Stat	2-Tail Sig.
GDP2	-18.695	8.856	-2.111	0.043
GDI21	-8.381	4.272	-1.962	0.059
DEBT21	2.338	1.186	1.971	0.058
REER2	0.012	0.008	1.473	0.151
POL2	-0.452	0.205	-2.202	0.035

Note: Log likelihood = -12.496 ; pseudo R squared = 0.47

Table (4.3)
MODIFIED CONTROL GROUP ESTIMATES OF STRUCTURAL ADJUSTMENT PROGRAM

Comparing period 3 (1985-89) to period 2 (1981-84)

	LIC	SSA
Change in GDP growth	0.010 (1.733) ***	-0.014 (-0.830)
Change in ratio of exports to GDP	0.026 (1.570) ****	0.080 (2.459) *
Change in ratio of GDI to GDP	-0.053 (-1.906) **	-0.084 (-2.314) *
Change in ratio of GDS to GDP	-0.017 (-0.691)	-0.083 (-1.574) ****
Change in inflation	0.026 (0.383)	0.122 (1.244) ****

t statistics in parentheses

* Statistically significant at the 5% level
** Statistically significant at the 6.5% level
*** Statistically significant at the 9% level
**** Statistically significant at the 12% level
***** Statistically significant at the 22% level

5. CONCLUSIONS

The main conclusion of the preliminary analysis of this paper regarding the causes of the economic crisis that swept Sub-Saharan Africa over the 1980s, is that the adverse exogenous shocks that impacted the continent- and other developing countries-over the first half of the 1980s, have certainly been the trigger that pushed these economies to the brink of crisis and to the subsequent adoption of the Bank- assisted type reforms; the exogenous shocks, however, do not by themselves, explain either the economic decline or the adoption of reform in Sub-Saharan Africa. Our analysis shows that the group of Sub-Saharan African countries that undertook the Bank-supported adjustment have in fact entered the 1980s decade with relatively weaker economies; hence, it is natural, therefore, that the exogenous shocks have had a much more devastating impact on the economies of the EIAL and OAL countries of SSA than their NAL counterparts. The interaction between the external shocks and the initial conditions that prevailed in the 1970s is key to understanding why both of the two developments happened for certain countries and not others.

The other question addressed in this paper is the effectiveness of Bank-supported reform programs in improving economic performance in the adjusting countries of Sub-Saharan Africa relative to others. We motivated the analysis of this problem by performing simple before and after comparisons of economic performances for each of the three groups of countries considered (EIAL, OAL and NAL). The before and after approach gives a picture of what has actually happened after the implementation of the program; it does not, however, answer the question regarding the effectiveness of programs. To address this question satisfactorily, we need to estimate the marginal contribution of the program for given initial conditions, exogenous shocks, and the counterfactual policy stance

that would have prevailed in the absence of the program. This will require a methodology that allows for endogenizing the participation decision itself. But also the validity of the maintained identification conditions regarding the participation decisions must be addressed as well. An appropriate methodology to address the above concerns was developed and implemented in sections 3 and 4 of this paper.

The results of our modified-control-group estimation on the impact of adjustment on the economic performance of the EIAL countries of Sub-Saharan Africa relative to others, suggest that adjustment programs have had a statistically significant and positive effect on export performance, and that they have also caused statistically significant drop in aggregate investment. These results corroborate the findings obtained for Bank-wide adjustment lending by Corbo and Rojas(1991).[18] Also according to our results, there is only weak evidence of a statistically significant effect of adjustment on GDP growth. This result is at variance with the strong evidence in support of a positive effect for Bank-wide adjustment programs on GDP growth (e.g. Corbo and Rojas(1991)).[19]

The combination of the estimated nonsignificant marginal effect of adjustment on economic growth, and its negative and significant influence on investment, obtained for Sub-Saharan Africa's experience with adjustment lending;

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[18] Conway (1990) - who applied a different statistical methodology on 76 developing countries, arrived at broadly similar conclusions to that of Corbo and Rojas (1991). Using a similar statistical methodology to ours though a different base period, the Third Report on Adjustment Lending (RAL III, 1992), however, concludes that adjustment has restored growth in SSA to the moderate levels of the 1970s. Still, the majority view in the international development community, including the Bank, is that there is much to be desired in terms of restoring growth and social welfare to Sub-Saharan Africa (e.g. Summers (1992)).

[19] Faini et al (1990), who estimated a modified-control-group model using cross sectional data from 93 developing countries; found similar evidence to ours, however, regarding the effect of adjustment on economic growth.

imply that the perceived increase in the efficiency of investment -supposed to be generated by the reform programs- has not been sufficient, in order to counterbalance the ensuing decline in investment, and hence to restore economic growth. Finally our results show that domestic inflation in EIAL countries of Sub-Saharan Africa is not significantly different from other comparators; since nonprogram countries in the modified-control group analysis include CAL in addition to NAL, the above result should not minimize the concern regarding the rising inflation in the adjusting countries (EIAL and OAL) of Sub-Saharan Africa (e.g. Chhibber (1991)).

The results of this study are somewhat encouraging in that the marginal contribution of Bank-supported adjustment programs to export performance has been positive and significant, given the potentially important positive inter-linkages between export growth and overall economic growth.[20] On the other hand, the findings that adjustment programs have not significantly affected overall economic growth in SSA and have had a deleterious effect on investment, lend credence to those who call for more explicit considerations of the peculiar initial conditions of the economies of SSA in the design, emphasis and time horizon of the adjustment programs recommended for SSA (e.g. Helleiner op. cit.). In order to facilitate the process of smooth and efficient allocation of

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[20] Though there is growing evidence of a stable positive relationship between openness (or even exports growth -- an indicator of 'revealed' policy) and overall economic growth for developing countries as a group, there is considerable skepticism about the strength of this relationship for SSA (see for example the survey paper by Helleiner (1991)). More recently, however, Matin (1992) finds strong and robust evidence on a positive relationship between economic performance and openness in SSA. He explains his findings by that unlike the previous cross-section estimation with period average data, his panel data analysis using a fixed effect model avoids obscuring the significant changes in openness that have occurred over the last decade in SSA. Moreover, he argued that the cross-section estimation fails to control for unobserved country-specific differences that can bias the coefficients' estimates.

resources, a redefined but important role for governments in reforming African economies is in order. While fiscal and monetary retrenchment are still indispensable for the success of reforms, more public investment on infrastructure, human capital and agricultural technology is particularly critical for generating supply response in SSA. Furthermore, efforts need to be made to raise the credibility (to the private sector) of policy reforms and to enhance the degree of program implementation. Also, our results clearly show the critical role (of the politically-sensitive issue) of "governance"[21] and political stability in influencing adoption, implementation, sustainability and credibility of adjustment programs.

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[21] A broad definition of the term "governance" is given by Landell-Mills and Serageldin (1991) as "the use of political authority and exercise of control over a society and the management of its resources for social and economic development". Also see the above reference on further elaboration on the meaning of governance, characteristics of good governance and means of fostering good governance, among other issues.

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APPENDIX A

A.1 Some Definitions

All the data used in the analysis are taken from the World Bank's ANDREX data base except the real effective exchange rate, which is from IMF statistics. The sample consists of 45 low income countries, listed in Table (A.1). The sample period is 1970-89.

The variables are defined for three periods: 1970-80 (first), 1981-84 (second), 1985-89 (third). The number following the variable is the period, i.e. GDP2 is the rate of GDP growth in period 2. Variables with a number 21 mean period 2 relative to period 1 and with number 32, period 3 relative to period 2. Following is a description of the variables

Five indicators

GDP	Rate of GDP growth
GDI_	Gross investment to GDP ratio
GDS_	Gross domestic savings to GDP ratio
X_	Export to GDP ratio
INFL_	CPI inflation

Others

INT_	Internal Shock[22]
EXT_	External Shock (positive)
CAB_	Current Account Balance to GDP ratio
DEBT_	Total debt to GDP ratio
REER_	Real effective exchange rate
TOT_	Terms of trade index

Dummy variables

AFR	1 if a country is African, 0 otherwise
LAC	1 if a country is Latin American, 0 otherwise
ASIA	1 if a country is Asian, 0 otherwise
MIC	1 if a country is middle-income, 0 otherwise
PROG	1 for EIAL (program countries), 0 otherwise

[22] Internal Shock was constructed by regressing cereal yield on a time trend and multiplying the excess of actual over predicted yield by the share of agriculture in GDP.

A.2 Overview of the Data

The data used in the analysis is taken from the World Bank's ANDREX data base, except the real effective exchange rate which comes from IMF calculations. The sample contains observations from 45 low income countries during the sample period 1970-89; the period for which data are available for all relevant macroeconomic variables. Only constant and price series were used. Most EIAL countries carried out a real depreciation in 1985-89, thus, the relative price of investment goods and exports rose relative to the early 1980s. Therefore, to measure the contribution of growth in the supply response of exports, it is better to work with GDP and export to GDP ratios in constant prices. For completeness and to satisfy the adding up condition, savings ratios at constant prices were also used. In the analysis, two categories of countries were defined: EIAL, program countries and a "control" group, the non-program countries, consisting of OALs and NALs. The OALs are considered non-program countries because they received too few adjustment loans during the period analyzed.

The sample period was divided into three periods: 1970-80 (first), 1981-84 (second) and 1985-89 (third), with the latter corresponding to the adjustment period. A comparison was made of the program countries' performance in the third period with respect to some counterfactual scenario of what would have happened in the absence of an adjustment program. Simple period averages of the following five indicators were used: rate of GDP growth, inflation and the ratios of gross domestic savings, gross investment and exports to GDP. Thus, for each country j, there is an observation for variable i in periods one, two and three. (A complete list of the variables used in the analysis is presented in Appendix A).

Table (A.1)
COUNTRY CLASSIFICATION

I.	EIAL (Early Intensive-Adjustment-Lending Countries) (14)	
	Bolivia	Mauritius
	Cote D'Ivoire	Nigeria
	Ghana	Pakistan
	Kenya	Senegal
	Madagascar	Tanzania
	Malawi	Togo
	Mauritania	Zambia
II.	OAL (Other Adjustment-Lending Countries) (16)	
	Bangladesh	Guyana
	Burkina Faso	Mali
	Burundi	Niger
	Central African Republic	Sierra Leone
	China, People's Republic of	Somalia
	Congo, People's Republic of	Sudan
	Guinea	Zaire
	Guinea-Bissau	Zimbabwe
III.	NAL (Non-Adjustment-Lending Countries) (11)	
	Benin	Liberia
	Botswana	Myanmar
	Cameroon	Rwanda
	Ethiopia	Sri Lanka
	Haiti	Yemen Arab Rep.
	India	

Notes:
EIAL are countries that have received 2 SALs or 3 adjustment Operation or more, with the first adjustment operation in 1985 or before.
OAL are other countries receiving adjustment lending.
NAL are countries that did not receive AL in the period 1980 to 1988.
The sample includes Sub-Saharan African countries and other Low income countries. The control group in the Modified-Control-Group method includes EIAL countries.

Table (A.2)
INDICATORS OF PERFORMANCE: EIAL COUNTRIES

	GDP1	GDP2	GDP3	GDI1	GDI2	GDI3	GDS1	GDS2	GDS3	X1	X2	X3	INFL1	INFL2	INFL3
Bolivia	0.042	-0.026	0.009	0.219	0.096	0.056	0.206	0.124	0.016	0.291	0.209	0.263	0.233	4.255	24.141
Cote D'Ivoire	0.060	-0.002	0.009	0.200	0.164	0.096	0.217	0.161	0.145	0.350	0.356	0.312	0.122	0.066	0.035
Ghana	0.005	-0.016	0.055	0.072	0.048	0.065	0.071	0.042	0.058	0.132	0.073	0.084	0.435	0.753	0.263
Kenya	0.082	0.021	0.056	0.303	0.209	0.197	0.258	0.189	0.176	0.368	0.256	0.255	0.121	0.135	0.081
Madagascar	0.011	-0.022	0.026	0.126	0.101	0.108	0.008	0.000	0.012	0.130	0.099	0.100	0.094	0.229	0.152
Mauritania	0.016	0.004	0.038	0.282	0.375	0.256	0.078	-0.012	0.152	0.372	0.469	0.526	0.096	0.099	0.126
Mauritius	0.056	0.040	0.077	0.297	0.208	0.321	0.295	0.197	0.375	0.527	0.470	0.590	0.150	0.097	0.061
Malawi	0.062	0.016	0.028	0.321	0.193	0.137	0.168	0.148	0.081	0.230	0.208	0.227	0.095	0.138	0.192
Nigeria	0.044	-0.047	0.032	0.194	0.159	0.083	0.207	0.119	0.090	0.223	0.112	0.125	0.153	0.228	0.200
Pakistan	0.047	0.066	0.064	0.190	0.190	0.185	0.096	0.147	0.184	0.129	0.132	0.144	0.124	0.076	0.061
Senegal	0.019	0.032	0.032	0.181	0.150	0.154	-0.286	-0.082	-0.169	0.293	0.328	0.353	0.104	0.117	0.027
Togo	0.044	-0.017	0.033	0.340	0.248	0.227	0.328	0.201	0.121	0.413	0.453	0.475	0.103	0.092	0.003
Tanzania	0.034	0.006	0.038	0.241	0.208	0.211	0.146	0.110	0.085	0.122	0.131	0.101	0.142	0.292	0.319
Zambia	0.015	0.002	0.023	0.411	0.149	0.145	0.447	0.113	0.136	0.466	0.367	0.356	0.112	0.165	0.469

Notes: GDP_ : rate of growth of GDP
GDI_ : gross domestic investment to GDP ratio
GDS_ : Gross domestic saving to GDP ratio
X_ : Total exports to GDP ratio
INFL_: Inflation
The numbers after the variable mean period 1, period 2 and period 3.

APPENDIX B

B.1 Some Specification Tests

Specification (6') of section 4 above suggests that the right hand side variables Y_k may be endogenous. I test for this source of conventional endogeniety under each of assumptions (8A) and (8B)[23] and for both LIC and SSA, using a large sample Hausman (1978) type specification test. (See also White (1982)).[24] Table (B.4.3.) of the appendix contains the results of the test.

Based on the tests for conventional endogeniety, I test next for the validity of assumptions (8A) and (8B). The test is simply obtained by estimating equation (6') for the periods in the pre-reform period of 1970-80, where the 'would be' EIAL countries were taken as program countries. A valid assumption should produce <u>insignificant</u> marginal program effects. The results of the

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[23] For the case of assumption (8B) the instrumented d_i $(\hat{d}_i)$ is obtained from estimating a probit model (see section (4.1) above).

[24] Assume the following linear relationship:

(A) $y = X_1\beta_1 + X_2\beta_2 + \epsilon$, where the X_1 variables are possibly correlated with ϵ while the X_2 are not. Given the matrix of instruments Z (which should include X_2) let $\hat{X}_1 = P_Z X_1 = Z(Z'Z)^{-1}Z'X_1$ and consider the following regression:

(B) $y = X_1\beta_1 + X_2\beta_2 + \hat{X}_1\alpha + v$. Now a test for H_o: $\alpha = o$ (a test for the covariation between X_1 and ϵ in A) is given by $[SSE(A) - SSE(B)]/[SSE(B)/d.f.] \sim \chi^2_\kappa$, where d.f. is the degrees of freedom in (A), κ is the number of variables in X_1, and SSE is the Sum of squares of the residuals obtained from OLS regression. This test, however, assumes no-heteroskedasticity, and may not be valid in the event of significant heteroskedasticity in the disturbance term.

estimations (not reported here) allow us to take assumption (8B) as a maintained hypothesis in all cases except for the case of real GDP growth for LICs. The results of the estimations for the chosen models are reported in tables (B.4.1) and B.4.2) below.

Table (B.4.1)

MODIFIED CONTROL-GROUP ESTIMATES OF PROGRAM EFFECTS

(constant prices)

(1985-89 relative to 1981-84)

Low income countries

	Dependent Variable				
	Change in GDP growth (OLS, d)	Change in Investment/GDP (OLS, d-hat)	Change in Saving/GDP (OLS, d-hat)	Change in Exports/GDP (OLS, d-hat)	Change in Inflation (TSLS, d-hat)
Regressors					
C	0.1510	0.350	0.201	..	..
	-4.1390	(3.952)	(2.905)	..	..
GDP2	-0.9680	-0.628	..	0.433	2.506
	(-7.961)	(-2.605)	..	(2.267)	(2.020)
GDI2	0.1490	..	0.161	-0.067	-0.300
	-4.0400	..	(1.196)	(-1.077)	(-.800)
GDS2	..	..	-0.206	-0.043	-0.054
	..	..	(-4.393)	(-1.428)	(-.283)
X2	-0.0890	-0.196	-0.089	0.070	..
	(-3.680)	(-3.714)	(-1.351)	(1.475)	..
INFL2	..	..	-0.027	..	0.298
	..	..	(-2.938)	..	(1.190)
DEF2	..	..	..	..	-2.124
	..	..	..	..	(-3.555)
REER2	-0.0002	-0.001	..	0.000	-0.004
	(-1.417)	(-2.298)	..	(1.548)	(-2.751)
TOT2	-0.0006	-0.002	-0.001	..	..
	(-3.189)	(-4.366)	(-2.851)	..	..
INT32	0.0080	..	..	..	-0.113
	(2.059)	..	..	..	(-2.996)
EXT32	0.0670	0.140	0.534	..	..
	(2.234)	(1.999)	(5.365)	..	..
POL86	-0.0085	-0.011	-0.013	-0.008	0.035
	(-3.772)	(-1.292)	(-1.650)	(-2.148)	(2.209)
LAC	-0.0290	..	..	..	0.050
	(-3.940)	..	..	..	(0.374)
AFR	..	0.028	..	..	..
	..	(1.587)	..	..	..
MIC	..	..	0.028	..	..
	..	..	(0.887)	..	..
PROGHAT	0.0100	-0.053	-0.017	0.026	0.075
	(1.733) *	(-1.906) **	(-0.691)	(1.570) ***	(0.805)

* Statistically significant at the 9% level

** Statistically significant at the 6.5% level

*** Statistically significant at the 12% level

Table (B.4.2)
MODIFIED CONTROL-GROUP ESTIMATES OF PROGRAM EFFECTS
(constant prices)
(1985-89 relative to 1981-84)

Sub-Saharan Africa

	Dependent Variable				
	Change in GDP growth (OLS, d hat)	Change in Investment/GDP (OLS, d hat)	Change in Saving/GDP (OLS, d hat)	Change in Exports/GDP (OLS, d hat)	Change in Inflation (OLS, d hat)
Regressors					
C	0.192	0.319	0.269	..	..
	(5.492)	(3.907)	(3.514)	..	..
GDP2	-1.129	-0.745	-0.742	0.745	1.732
	(-9.739)	(-2.373)	(-1.402)	(2.217)	(2.299)
GDI2	0.194	-0.167	0.234	-0.066	-0.231
	(3.757)	(-1.387)	(1.461)	(-0.587)	(-1.647)
GDS2	0.042	..	-0.150	-0.071	-0.133
	(2.551)	..	(-2.293)	(-2.075)	(-2.191)
X2	-0.090	-0.118	..	..	..
	(-2.604)	(-1.643)	..	..	..
INFL2	..	-0.126	..	-0.057	0.337
	..	(-2.430)	..	(-1.002)	(1.750)
DEF2	..	-0.017	..	..	..
	..	(-1.213)	..	..	..
REER2	-0.000	..	..	0.000	-0.002
	(-1.420)	..	..	(0.866)	(-1.857)
TOT2	-0.001	-0.001	-0.001	0.000	..
	(-3.702)	(-2.990)	(-1.828)	(0.806)	..
INT32	0.011	0.016	..	..	-0.170
	(1.725)	(1.009)	..	..	(-2.786)
EXT32	0.108	0.108	0.600	-0.115	..
	(3.594)	(1.534)	(5.214)	(-1.495)	..
POL86	-0.013	-0.016	-0.030	-0.013	0.022
	(-3.819)	(-1.139)	(-3.059)	(-1.910)	(1.749)
MIC	-0.019	..	..	..	-0.072
	(-1.482)	..	..	..	(-1.353)
PROGHAT	-0.014	-0.084	-0.083	0.080	0.122
	(-0.830)	(-2.314) *	(-1.574) **	(2.459) *	(1.244) ***

* Statistically significant at the 5% level
** Statistically significant at the 12% level
*** Statistically significant at the 22% level

Table (B.4.3)
Hausman Specification Test for Conventional Endogeneity

LOW INCOME COUNTRIES

		SSE(A)	SSE(B)	Number of Restrictions (K)	[SSE(A)-SSE(B)]/ [SSE(B)/d.f.]	
GDP	PROG	0.014203	0.007449	4	7.25	
	PROGHAT	0.014522	0.004744	4	16.26	*
GDI	PROG	0.091428	0.042994	3	9.03	
	PROGHAT	0.084016	0.042277	3	7.91	
GDS	PROG	0.101140	0.036014	4	12.67	**
	PROGHAT	0.102223	0.044337	4	9.12	
X	PROG	0.056958	0.030937	5	5.58	
	PROGHAT	0.055206	0.037379	5	3.82	
INFL	PROG	0.414420	0.115240	6	19.95	*
	PROGHAT	0.426975	0.117331	6	20.64	*

SUB SAHARAN AFRICA

		SSE(A)	SSE(B)	Number of Restrictions (K)	[SSE(A)-SSE(B)]/ [SSE(B)/d.f.]	
GDP	PROG	0.007902	0.002894	4	9.01	
	PROGHAT	0.008018	0.003222	4	7.42	
GDI	PROG	0.061776	0.031622	4	4.69	
	PROGHAT	0.058446	0.020400	4	9.60	
GDS	PROG	0.092260	0.026488	3	10.91	***
	PROGHAT	0.087296	0.033600	3	7.93	
X	PROG	0.039680	0.020192	3	4.89	
	PROGHAT	0.040204	0.018022	3	6.16	
INFL	PROG	0.300759	0.113007	4	8.31	
	PROGHAT	0.285345	0.113976	4	7.51	

* Statistically significant at 1% level
** Statistically significant at 2.5% level
*** Statistically significant at 5% level

Fig (B.4.1.)

Probit (Low Income Countries)

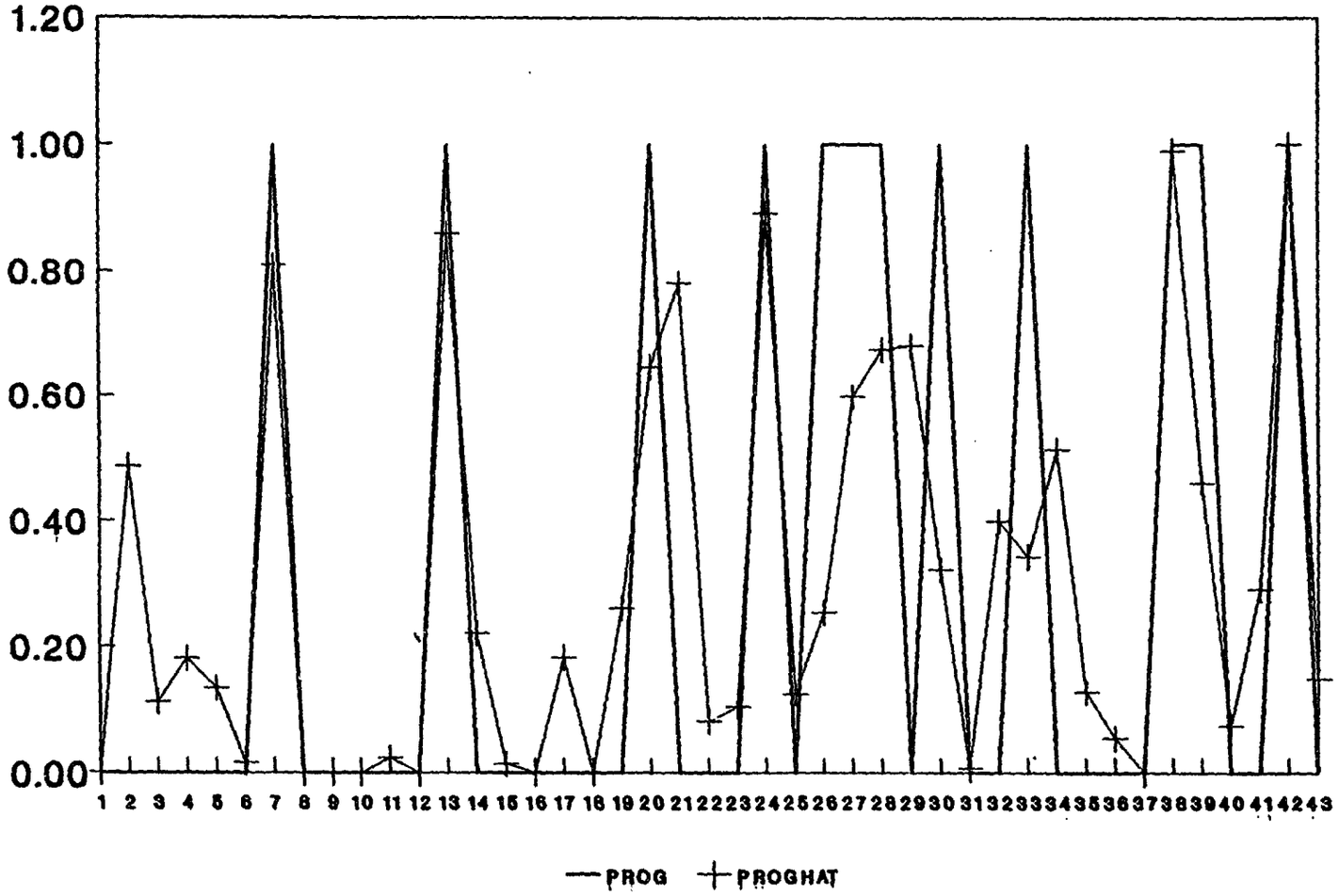
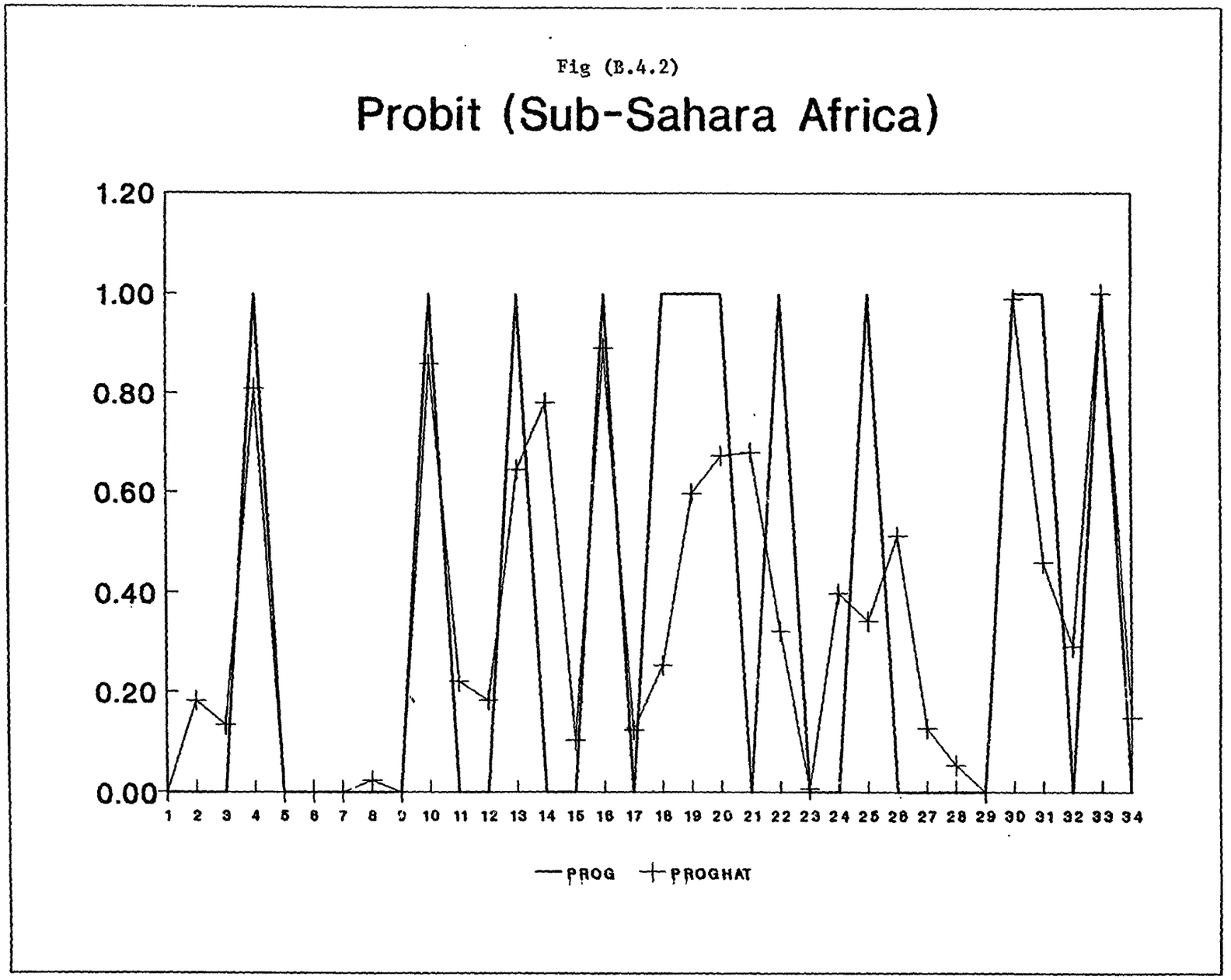


Fig (B.4.2)


Probit (Sub-Sahara Africa)
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34
PROG
PROGHAT

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